

Michigan Intersection Safety Strategy and Near-Term Action Plan



Governor's Traffic Safety Advisory Commission

Member agencies:

Michigan Department of Transportation
Office of Highway Safety Planning
Michigan Department of State
Michigan State Police
Office of Services to the Aging
Michigan Department of Education
Michigan Department of Community Health

2007

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National Background

Nationally, intersection-related crashes represented more than 40 percent of all crashes reported in 2002. This amounted to more than 2.8 million crashes resulting in more than 9,400 fatalities (22% of total fatalities) and nearly 1 million injured citizens (49% of injury crashes). Given the high number of fatalities and injuries, many transportation safety agencies and organizations are developing plans and programs to focus on intersection safety.

A review of national data led to a National Intersection Safety Workshop held in Milwaukee, WI on November 14-16, 2001. Experts from all disciplines of traffic safety developed a strategic **national agenda for intersection safety** providing a blueprint for strategic action at the national, state, and local level aimed to make intersections safer.

Intersection safety is one of the emphasis areas in the Strategic Highway Safety Plan from the American Association of State Highway and Transportation Officials (AASHTO), it is included in the Institute of Transportation Engineers' (ITE) Safety Action Plan, and it is recognized as one of four priority areas in the Federal Highway Administration's Performance Plan.

Action Plan Development

Michigan's intersection crash data parallels the national data. In 2002, the Governor's Traffic Safety Advisory Commission (GTSAC) identified Intersection Safety as one of its three main issues to address. The GTSAC created an Intersection Safety Action Team and, using the national agenda as a guide, developed the Michigan Intersection Safety Action Plan (ISAP).

Issues and strategies from the national agenda were carried forward into the Michigan plan, as well as other issues and strategies not mentioned in the national plan. The Michigan plan was further enhanced by the addition of near-term action steps.

The Issue: High Crash Intersections

In Michigan, there were 93,798 intersection crashes in 2006 representing 29% of all the reported crashes. These intersection crashes resulted in 281 fatalities (26% of all Michigan roadway fatalities) and 2,860 incapacitating injuries (33% of all Michigan incapacitating injuries). As depicted in the table, there is a positive, downward trend in the number of intersection crashes, fatalities, and injuries in Michigan. ***In fact there were 34% fewer intersection crashes, 30% fewer fatalities and 55% fewer KA injuries in 2006 than in 1998.***

Year	Intersection Crashes	% of Intersection Crashes to Total Crashes	Intersection Fatalities	% of Intersection Fatalities to Total Fatalities	KA Intersection Injuries	% of KA Intersection Injuries to Total KA Injuries
1998	142,441	35%	403	29%	6,481	43%
1999	141,052	34%	420	30%	5,569	39%
2000	140,654	33%	413	30%	5,020	38%
2001	126,892	32%	381	29%	4,336	37%
2002	122,361	30%	373	29%	4,071	38%
2003	119,360	30%	337	26%	3,774	33%
2004	113,373	30%	295	25%	3,511	35%
2005	104,343	29%	295	26%	3,181	33%
2006	93,798	29%	281	26%	2,860	33%

“K” injury is a death; “A” injury is incapacitating. “KA” refers to any crash in which “K” or “A” injury occurs.
Definition: An intersection crash is any crash occurring at an intersection or at a driveway within 150 feet of an intersection. Intersection crashes also include crashes coded by the reporting officer as being related to an intersection, regardless of actual distance to the intersection.

NOTE: Beginning in 2004, the property damage reporting threshold in Michigan increases from \$400 to \$1,000. This will not affect the reporting of injury or fatal crashes, but will result in a possible reduction of property damage crashes. The resulting reduction may cause an artificially inflated increase in KA crash percentages as reported above.

Michigan Intersection Safety Goals

The goal of this Intersection Safety Action Plan is to outline a course of action that, when followed, targets a reduction in the number and severity of intersection-related crashes in Michigan by 2009, as follows:

- Number of intersection crashes < 100,000
- Number of intersection fatalities < 300
- Number of KA intersection injuries < 3,000

Note: For analysis purposes only, an assumption was made that a constant reduction in crash fatalities and injuries will be achieved each year.

Benefit Analysis

Achieving a reduction in the number of intersection fatalities to 300 in five years should result in saving approximately 150 lives over those five years (10 + 20 + 30 + 40 + 50). The National Safety Council estimates that the calculable cost of each highway crash fatality is \$1,090,000. Non-fatal disabling injuries are estimated to cost \$49,900, and the cost for minor injuries/property damage are estimated to be \$6,200. Eliminating 150 deaths in Michigan over five years would save more than \$163 million. The associated reduction of injuries and property damage would increase the savings over five years to \$828 million.

Year	GOALS			ACTUALS		
	Intersection Crashes	Intersection Fatalities	KA Intersection Injuries	Intersection Crashes	Intersection Fatalities	KA Intersection Injuries
2003	119,161	362	3,918	119,360 (+199)	337 (-25)	3,774 (-144)
2004	115,961	351	3,765	113,373 (-5,987)	295 (-42)	3,227 (-547)
2005	112,761	340	3,612	104,343 (-9,030)	295 (0)	3,181 (-46)
2006	109,561	329	3,459	93,798 (-10,545)	281 (-14)	2,860 (-321)
2007	106,361	318	3,306			
2008	103,161	307	3,153			
2009	99,961	296	3,000			

From 2003-2006 we have seen a reduction of:

25,363 Intersection crashes

81 Fatalities

1,058 Serious injuries

Michigan Intersection Safety Issues, Strategies, and Near-Term Actions

ACCOMPLISHMENTS



LEGISLATIVE / POLITICAL OUTREACH

Issues Addressed:

1. To the extent that targeted legislation can assist the overall highway safety effort, it is important that the Legislature understand the benefits of traffic safety programs, the valuable role of crash data in such programs, and the need for continuing crash data support.
2. To the extent that budget and policy decisions can affect highway safety, it is important that leaders and staff within the political system recognize the benefits of promoting and investing in safety programs.
3. Within the highway safety community, there is a need for strong and active leadership with a focus on intersection safety.
4. Support for safety must include all agencies so there is a unified voice for traffic safety.

Strategies:

1. Provide coordinated advisory group input to the Legislature, pro-actively and re-actively, on safety issues:
 - Develop and provide balanced information on sensitive issues – position papers, etc.
2. Help communities and political leaders understand the benefits of crash countermeasures.
 - Raise awareness of intersection problems with key state, county, and local leaders.
 - Show benefits/costs to decision-makers (intersection safety improvement versus crash and medical costs).
 - Provide examples of safety measures: AAA Road Improvement Demonstration program results, signal re-timing, etc. Offer support materials to these officials for use in discussions with colloques and constituents.
 - Demonstrate the economic and societal benefits of increased intersection safety.
 - Provide examples of 'model' legislation from other states.
3. Provide recognition to jurisdictions and/or officials who have brought about a significant decrease in intersection crashes. Help local officials understand the data for their own region.
4. Develop and target access-control education for elected officials, zoning officials, planning personnel who grant access, and property owners. Provide education at all levels. Demonstrate why access control such an important part of intersection safety.

Near-term Action Plans:

#	Near-Term Action	Contact	Agency
1	The ISAP team will make available a list of best practice presentations to state and local officials and safety partners. These include but are not limited to: <ul style="list-style-type: none"> • AAA Road Improvement Demonstration Program • Roundabouts • Signal timing 	Dave Morena	FHWA
2007 ACCOMPLISHMENTS			
<i>Dave Morena has compiled and distributed a list of various safety presentations and speakers.</i>			

2	Review National Uniform Vehicle code to determine differences with Michigan's Vehicle Code with regards to intersection safety	Jeff Bagdade Lance Cook	Opus Hamilton MSP
2007 ACCOMPLISHMENTS			
<i>No Update to report at this time</i>			

Resources:

Michigan Legislative Information: michiganlegislature.org

2001-2006 ACOMPLISHMENTS

In October 2001, The Michigan Department of Transportation (MDOT) published, "The Access Management Guidebook – reducing traffic congestion and improving safety in Michigan Communities". Along with the guidebook, a six-hour training program was developed for state & local officials and business owners.

MDOT teamed with the Michigan Society of Planning in the printing of the guidebook and the sponsorship of the six-hour training program. Initially MDOT/MSP conducted a series of special training programs. The first set was for land use planning consultants who assist local governments with the development of land use plans and zoning ordinances; 20 firms sent representatives to this program. Then MDOT/MSP conducted a program within MDOT at 3 locations and nearly 100 MDOT Region and Transportation Service Center staff members attended. Finally, during fiscal year 2002 through 2004, MDOT/MSP sponsored 24 access management-training seminars specifically targeted for local government elected officials, planning commissioners and staff. Nearly 750 individuals attended these sessions. The latest seminar was held on Tuesday, April 19, 2005 in the State Secondary Complex, Lansing.

MDOT has published a brochure, "Access Management – How it can Benefit your Business" (2002 and updated 2004). This brochure is distributed by MDOT through its Region and Transportation Service Centers when meeting with local officials concerning site access issues and at speaking engagements at local Chamber of Commerce, Rotary and other local interest groups.

Corridor Access Management Plans:

- ❖ *MDOT has funded and worked with numerous cities, villages and townships in developing corridor access management plans and ordinances along State arterial highways. Between January, 2002 and January, 2005 MDOT has completed or is nearing the completion of 12 corridor access management plans that cover nearly 160 miles of state trunk-line.*
- ❖ *In FY2005, MDOT in cooperation with local units of government completed 8 corridor access management plans statewide.*
- ❖ *In FY2006 there are 3 corridor access management plans in process and 5 more being prepared for contract services*
- ❖ *MDOT Transportation Service Centers have begun to incorporate access management within their rehabilitation/reconstruction projects. This generally involves identifying businesses with multiple access points. Then, through a mutual agreement, MDOT & each business develops a closure/relocation site plan in which MDOT pays for changes as part of its rehabilitation/reconstruction project.*

SAFETY MANAGEMENT

Issues Addressed:

1. A systematic approach to address intersection safety is needed.
2. Intersection safety strategies should balance the competing demands of congestion reduction and safety enhancements including the interactive effects and conflicts of achieving one to the detriment of the other.
3. Provide quality information at the state, county, and local level where intersection safety can be best addressed.
4. A common goal for intersection safety is necessary to coordinate efforts by the police, engineers, educators, EMS, and others.

Strategies:

1. Develop a multi-disciplinary/multi-agency safety task group within the state and in each locality to address intersection safety issues.
 - Identify current activities by various groups or individuals
 - Establish communication systems to share information and data.
2. Incorporate safety in the planning process. Institutionalize the involvement of safety organizations in the development and review of safety plans and metropolitan planning organization products.
3. Develop a clearinghouse (help desk/web site) for intersection safety. This would be a centralized location for a variety of stakeholder groups to provide input.

Near-term Action Plans:

#	Near-Term Action	Contact	Agency
1	The GTSAC will continue to convene the Intersection Safety Action Team and they will monitor the implementation of the ISAP	Steve Schreier	OHSP
2007 ACCOMPLISHMENTS			
<i>The Intersection Safety Action Team continues to 'meet' via email correspondence 3-5 times each year. In addition there is an update provided to the GTSAC about ISAP activities 2 times each year</i>			

2	MDOT and OHSP will continue to promote safety-conscious planning at the MPO level:	Marsha Small	MDOT
	<ul style="list-style-type: none"> • Promote and support safety forums for each MPO area • Encourage MPO's to monitor crashes in their region and identify for their constituent agencies the high-crash locations that might be pursued for development of safety projects • Provide MPO's and counties with yearly intersection crash data 	Steve Schreier	OHSP
2007 ACCOMPLISHMENTS			
<p><i>Current MPO Traffic Safety studies include Muskegon and Kalamazoo. In addition a meeting was held April 25th 2007 with the Bay County MPO, WSU and OHSP. The purpose of this meeting was to understand what has been done with the Traffic Safety Study conducted by WSU in 2004. The following were the key points uncovered:</i></p> <ol style="list-style-type: none"> 1. <i>The report funded by OHSP and produced by WSU is a good report with many useful recommendations.</i> 2. <i>The report is used by local and state agencies in a variety of capacities, from verification that an issue is an issue to including information in other reports and information.</i> 3. <i>The main obstacles in implementing any recommendation are funding, personnel resources, public support, political support and an educational understanding of what 'traffic safety' is or is not.</i> 4. <i>Local, State and MPO officials generally agree on the issues discussed and what has happened in the past 3 years since the report was produced.</i> 5. <i>Local, State and MPO officials are supportive of promoting and implementing more safety projects if some of the obstacles identified above we able to be overcome.</i> 6. <i>Local, State and MPO officials are supportive of providing educational information to various agencies, organizations and political groups as needed and/or when the occasion presents itself.</i> 			

3	Include a breakout session(s) at the annual Traffic Safety Summit hosted by MDOT and OHSP	Mark Bott	MDOT
2007 ACCOMPLISHMENTS			
<i>There were 4 sessions at the 2007 Traffic Safety Summit dedicated to Data, Data Systems and engineering principles surrounding intersections and road safety.</i>			

4	The ISAP will continue to recognize actions to improve intersection safety, and add them to the existing structure for awards presented at the annual Michigan Traffic Safety Summit	Steve Schreier	OHSP
2007 ACCOMPLISHMENTS			
<i>This will be brought before the Intersection Safety Action Team at the next 2007 meeting for discussion and action as the group sees fit</i>			

2001-2006 ACOMPLISHMENTS			
<i>Updates on the ISAP are given to the GTSAC on a regular and on-going basis (2-times per year)</i>			
<i>During calendar year 2005, MDOT along with FHWA, OHSP, LTAP and others conducted seven (7) rural safety forums. These forums were conducted under the sponsorship of state regional planning agencies from around Michigan. Representatives from local agencies (township, city, county) planning, law enforcement and emergency services were invited. Another six (6) forums are expected to be held in 2006.</i>			
<i>MDOT and OHSP attended the latest SCP meetings held in Washington DC in August 2004 and at SEMCOG in May 2005.</i>			
<i>MDOT and OHSP continue to be engaged with MPO's on conducting year 2 safety forums. Currently there are 2-3 MPO's with formal plans to conduct these meetings.</i>			
<i>In cooperation with FHWA, Michigan was selected to participate in the Domestic Intersection Safety Scanning tour (along with four other states). The preliminary goal of these meetings is to reduce fatalities, personal injuries and crashes at intersections in the United States by documenting and subsequently promoting innovative intersection treatments and comprehensive intersection safety processes that have been implemented. A report similar to the: "Signalized Intersection Safety in Europe" which was published by FHWA in December 2003 as part of FHWA's International Technology Exchange Program will be produced. The meeting was held on January 31, 2005 and there were representatives from 15 different organization, groups and disciplines at the meeting. Once the final report has been created, it will be distributed to the ISAP team and the GTSAC.</i>			
<i>The 2005 Traffic Safety Summit included a workshop topic on ROUNDABOUTS and how they can attribute to improving intersection safety and congestion management issues. Over 50 people attended the workshop and it received high marks for content and information.</i>			

RESEARCH

Issues Addressed:

1. Reliable data is needed, but is not always available, to evaluate the effectiveness of safety countermeasures.
2. There is a need for focused research on intersection safety issues.

Strategies:

1. Conduct Research on Driver Information Countermeasures
 - Identify and prioritize gaps, prepare research problem statements to address the most critical knowledge gaps
 - Prepare a synthesis report on driver information countermeasures. Include a literature review and a survey. In addition, topics to be addressed include: dynamic signing, advisory speed signs/beacons, advance street name signs, larger and brighter warning signs, advance advisory flashing beacons, strobe light in signals, roadway illumination, how to accommodate high-risk road users and human factors/information overload.
 - Conduct human factors research related to intersection safety. There is a need to identify drivers' thoughts and perceptions as they approach an intersection, and the types of mental limitations that exist (information overload, complexity of information and decisions, etc.).
2. Perform research on the benefits and costs of intersection safety countermeasures.
3. Develop a program to conduct before-and-after studies of traffic safety engineering improvements around the state. Local and State Agencies would be able to apply to have a before-and-after study conducted on a specific traffic safety-engineering project. All completed studies would be made available on a web site. This initiative will help publicize the results of successful applications of safety improvements.

Near-term Action Plans:

#	Near-Term Action	Contact	Agency
1	The ISAP will identify issues that require further research and present to the appropriate 'agency' for further consideration	Steve Schreier	OHSP
2007 ACCOMPLISHMENTS			
<i>The ISAP is updated 2 times per year and distributed to partner agencies for review, comment and update(s) and also presented to the GTSAC each year</i>			

2	FHWA is conducting research of driver behavior at intersections with different signal placements	Dave Morena	FHWA
2007 ACCOMPLISHMENTS			
<i>No Update to report at this time</i>			

2001-2006 ACOMPLISHMENTS			
<i>High crash location data has been provided to 8 counties as part of the Safe Communities activities being conducted by OHSP.</i>			
<i>On January 1st, 2005, the TCRS Web tool was expanded to include non law enforcement traffic safety partners. Ongoing promotion of the tool has resulted in an increase in requests for access to the tool and a heightened interest intersection and traffic safety activities</i>			
<i>In 2006 a 'location' tool and road segment variable were added to the TCRS Web Tool. This allows for additional, more in-depth data queries and analysis including intersections.</i>			

DATA

Issues Addressed:

1. The ability of transportation professionals to identify and analyze intersections for safety improvements can be enhanced by improving the quality (e.g., coding, narratives, completeness, and accuracy) and timeliness of crash reports and data.
2. Computerized crash location identification is necessary for the successful system-wide analysis of the data.

Strategies:

1. Develop and maintain a continuing dialogue between users and collectors of crash data.
 - Ensure stakeholder participation at meetings with other action teams regarding intersection safety issues (e.g., TRCC)
 - Develop a highway physical features database
 - Improve safety management to the extent feasible within state and local agencies by developing intersection inventories. Keep records on each intersection, including location, geometrics, equipment, and traffic control.

Near-term Action Plans:

#	Near-Term Action	Contact	Agency
1	The ISAP team will investigate UD-10 coding discrepancies with intersection crashes	Dave Morena	FHWA

2007 ACCOMPLISHMENTS

The Crash Data User Group (CDUG) has met 5 times in 2007 to talk about UD-10 data issues including intersection coding, location and roundabouts. Several changes have been proposed and are under consideration.

2	The ISAP will identify missing UD-10 fields and/or field values (ie, Roundabouts) and propose UD-10 modifications and coding instruction updates	Dave Allyn	RCOC
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2007 ACCOMPLISHMENTS

The Crash Data User Group (CDUG) has met 5 times in 2007 to talk about UD-10 data issues including intersection coding, location and roundabouts. Several changes have been proposed and are under consideration.

Resources:

Michigan Traffic Crash Facts: Michigantrafficcrashfacts.org

2001-2006 ACOMPLISHMENTS

The CPR project continues to move forward on-time and within budget and the web tool used by law enforcement to identify high crash intersections continues to be an invaluable resource

On January 1st, 2005, the TCRS Web tool was expanded to include non law enforcement traffic safety partners. Ongoing promotion of the tool has resulted in an increase in requests for access to the tool and a heightened interest intersection and traffic safety activities

In 2006 a 'location' tool and road segment variable were added to the TCRS Web Tool. This allows for additional, more in-depth data queries and analysis including intersections.

SAFETY ANALYSIS TOOLS and PRACTICES

Issues Addressed:

1. A simple analysis system is needed to identify unsafe intersections.
2. Causal analysis of intersection crashes would be more accurate and complete if information on the state of the "environment" at crash locations were available (e.g., information on signal operation and design, and intersection layout can sometimes be related to driver behavior at an intersection).
3. There is a need to provide support at the local level in the areas of enforcement, engineering, education, and emergency management systems.

Strategies:

1. Conduct an inventory and analysis of existing intersection safety analysis tools. Steps include:
 - Identify user needs (vehicles, pedestrians, bicycles, etc.)
 - Determine available analysis tools
 - Determine shortfalls between needs and available tools
 - Reach consensus on critical tools that needs to be developed
2. Provide traffic engineering/safety support to local governments.
 - Perform safety audits on state and local systems as needed/requested
3. Adopt existing training programs, identify training gaps and create new training courses as applicable.

Near-term Action Plans:

#	Near-Term Action	Contact	Agency
1	The ISAP Team will promote systems that provide for the ability to identify and analyze high crash locations: <ul style="list-style-type: none"> • SEMCOG Crash Analysis Tool • RoadSoft tools for use by local agencies • Current MDOT tools and practices. • CPR tools • TIA 	Steve Schreier	OHSP

2007 ACCOMPLISHMENTS

In late 2006, a Crash Data User Group (CDUG) was formed as a sub-team to the Traffic Records Coordinating Council. The CDUG has since been meeting monthly reviewing traffic safety data issues and making recommendations and/or plans to resolve these issues. Access to traffic safety data has been a topic of discussion and will continue to be an item the group reviews each meeting.

In April 2007, the Traffic Improvement Association (TIA) made available to its member agencies a web-based traffic crash analysis tool called TCAT; an acronym for Traffic Crash Analysis Tool. TCAT is a comprehensive web-based application for the detailed analysis of traffic crashes in Michigan. The TCAT system consists of narrative crash reports, collision diagrams and GIS mapping of Michigan traffic crashes. The TCAT system allows users to obtain crash data for any intersection or road segment in the state. TCAT also allows users to conduct extensive filtering of crashes based on most data contained in the crash report. The TCAT system also provides its users with a variety of intersection and road segment ranking reports along with the ability to locate specific crashes in any county or community in the state. TIA receives weekly crash data updates from the state of Michigan which provides TCAT users with real time data to conduct timely, accurate crash analysis.

2	MDOT has established and will continue to promote the Local Safety Initiative program designed to provide analysis and propose solutions to local agencies	Dale Lighthizer	MDOT
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2007 ACCOMPLISHMENTS

Dale continues to promote the LSI program and works with many local agencies to identify safety issues including intersection related problems

3	The ISAP team will continue to bring FHWA/ITE Intersection Safety training courses to Michigan	Mark Bott Dave Morena	MDOT FHWA
2007 ACCOMPLISHMENTS			
<i>No Update to report at this time</i>			
4	MDOT will analyze current crash data to determine the top intersection crash areas and/or issues at the state and local level (5% report)	Jim Culp	MDOT
2007 ACCOMPLISHMENTS			
<i>No Update to report at this time</i>			
2001-2006 ACOMPLISHMENTS			
<i>In 2004, MDOT, MDIT, SEMCOG and OHSP conducted a fact finding meeting to understand what each agency is currently working on with regards to mapping high crash locations. It was decided to re-convene the group at a later date to review and determine what if any further actions and/or project coordination needs to take place.</i>			
<i>In 2004 MDOT created a local engineering technical assistance group headed up by Dale Lighthizer. Dale has put together the basic structure of the program and they are promoting this group's services to the local county road commissions. The first stage of this group's services includes data analysis of a road commission's area to determine possible safety counter-measures.</i>			
<i>MDOT Bay Region continues to partner with the Genesee County municipal planning organization with a goal to have all the signals in the county retimed in the next 3 years primarily with CMAC funds. Bay Region is developing a region-wide retiming program over five years.</i>			
<i>In 2006 the Local Safety Initiative (LSI) is an addition to the Safety Improvement Program to address the crash fatality rate on the local road system. Department staff have been dedicated to assistance interested counties and municipalities in identifying high crash on their road systems. Since its inception LSI has completed crash analysis in 15 counties including 13 cities and villages in those counties. The counties are in several stages:</i> <i>1 county has two projects with obligated funds.</i> <i>12 counties have had a field review.</i> <i>2 counties are waiting for a field review.</i> <i>Analysis is ongoing in 3 counties.</i> <i>A goal of the initiative is to provide matching funds to local roadway authorities beyond what is currently available from the department for safety measures. It is anticipated that 12 additional counties and five cities/villages will be added to the program in 2007.</i>			
<i>In 2004 Over 1,100 copies of the Michigan Traffic Safety Fundamentals Handbook were distributed to Law Enforcement agencies, County Road Associations and MDOT regional offices</i>			
<i>MTU, in cooperation with OHSP, has hosted and continues to host a one-day Intersection Safety class aimed at the non-engineering community. To date over 500 hundred students have been trained through out the state including in Marquette, Mt. Pleasant, Traverse City, Cadillac, Hillman, Saginaw, Lansing, Gaylord, Jackson, Grand Rapids, Kalamazoo, Ann Arbor, Brighton, Howell, Big Rapids, Petosky, St. Ignace, Flint, Detroit, Port Huron and at the State Court Administrator's Conference and at the National Association of County Engineers (NACE) Annual Conference in Grand Rapids.</i>			
<i>In 2004 MDOT hosted two one-day Intersection Safety Workshops in Grand Rapids, Novi and Lansing</i> <i>1. <u>Intersection Safety</u>: This is a 1 day discussion of safety aspects of all types of intersections, with emphasis on non-signalized intersections. Known safety effects of a comprehensive list of countermeasures are discussed and presented.</i> <i>2. <u>Signalized Intersection Guidebook</u>: This workshop focuses on signalized intersections, particularly high volume ADT. The content includes safety, but includes discussion of design and operations. The instructor has suggested that engineers responsible for city or trunk-line road systems would benefit from both courses. Engineers from non-urban counties would really benefit from the Intersection Safety Workshop and may not need the second course.</i>			

ENGINEERING COUNTERMEASURES

Issues Addressed:

1. Within the highway safety community, there is a need to increase the knowledge base of effective safety improvements.
2. The operation and design of intersections often must balance the dual and conflicting objectives of operational efficiency versus safety.
3. Most systematic intersection safety programs at the state and federal level direct resources to high-volume urban intersections, to the exclusion of rural or low-volume intersections.

Strategies:

1. Increase intersection safety funding at state and local level
 - Increase safety program funds available for use by local governments.
 - 100% obligation of federal safety set-aside funds each year
 - Encourage MPO assistance to provide data for regional and sub-regional analysis to constituent agencies
2. Review and implement as appropriate the following documents/programs:
 - *AASHTO implementation guidelines that address signalized and unsignalized intersection accidents (NCHRP 17-18- 03).*
 - Results of past and future FHWA *international intersection safety scans*.
 - AAA Road Improvement Demonstration Program conducted in Detroit and Grand Rapids.
3. Establish grant and contract programs, with funding mechanisms, to institutionalize a strategic, statewide engineering approach to intersection safety, at the state and local level including but not limited to:
 - signal timing
 - traffic signal head and lamp visibility
 - unsignalized intersection safety improvements
 - signalized intersection safety improvements (expect individual Time-of Return analysis)
 - Evaluations of Roundabouts

Near-term Action Plans:

#	Near-Term Action	Contact	Agency
1	MDOT will continue to promote routine signal re-timing on a continuing basis for all signals in the state	Mark Bott	MDOT
2007 ACCOMPLISHMENTS			
<i>No Update to report at this time</i>			
2	Develop a statewide plan to implement signal display solutions: <ul style="list-style-type: none"> • MDOT clearance interval policy • Flashing yellow arrow for left turns • Flashing Red-to-Red • Update all signal heads to 12" lens • Box span signal design 	Mark Bott	MDOT
2007 ACCOMPLISHMENTS			
<i>No Update to report at this time</i>			
3	MDOT will continue the intersection safety program at signalized intersections on trunk line roads that recognizes and promotes known engineering countermeasures. Crashes involving fatalities and serious injuries will be emphasized and prioritized ahead of property damage only and less serious injury crashes.	Mark Bott	MDOT
2007 ACCOMPLISHMENTS			
<i>No Update to report at this time</i>			

4	MDOT will establish and pilot a low cost safety program at Un-signalized intersections on trunk line roads	Mark Bott	MDOT
2007 ACCOMPLISHMENTS			
<i>No Update to report at this time</i>			
5	MDOT will continue to promote and fund intersection safety programs at the local level	Chris Youngs	MDOT
2007 ACCOMPLISHMENTS			
<i>No Update to report at this time</i>			
6	Explore the feasibility of intersection lighting improvements on trunk-line and local road systems	Mark Bott	MDOT
2007 ACCOMPLISHMENTS			
<i>No Update to report at this time</i>			

Resources:

Driving Modern Roundabouts:

wsdot.wa.gov/eesc/cae/DesignVisualization/Video/Portfolio/Modern_Roundabouts/index.htm

2001-2006 ACOMPLISHMENTS	
<i>The Michigan Signal Summit team meets every 3 months to review issues and talk about future projects. Future activities include development of a data warehouse, countdown pedestrian signals, traffic signal re-timing strategy and potential expansion of ITS to Grand Rapids and/or Michigan.</i>	
<i>The MDOT Bay Region has applied for CMAC projects for state trunk-line corridor signal timing and upgrading: M-54/Dort Highway, Flint, M-21/Corunna and M-24/Lapeer</i>	
<i>In 2006, 149 signals predominantly along 8 corridors were retimed. Through the use of other funding, 200 additional traffic signals on state trunk-line were retimed. Studies have shown properly timed signal systems improve corridor travel time, reduce individual intersection delay by 5 to 20 percent, and result in a nine percent fuel savings. For M-59 in Macomb County the signal retiming effort in 2004 provided significant improvements of nine percent reduction in travel time, 46 percent reduction of average stopped time, and an average speed increase of nine percent. The savings in vehicle hours traveled and daily fuel consumption results in a benefit to cost ratio of 22 to 1.</i>	
<i>It is important to periodically update major traffic signal corridors in order to ensure efficient operation. MDOT's proposed goal is to retime corridors every eight years. The current retiming cycle is 15 years. To assist in this endeavor MDOT has committed funding to continue the retiming of trunk-line corridors. For 2007 a total of 589 signals are scheduled for retiming: 144 signals in the North Region, 188 in the Lansing Tri-County Area, 20 in Ottawa County, 139 in the Southwest Region, 10 in Genesee County and 88 in the University Region</i>	
12" signal heads	
<i>Below is the language from the 2005 Michigan Manual on Uniform Traffic Control Devices (MMUTCD) regarding signal head size. For new or modernized signal locations 12 inch signals should be used. This guidance goes beyond what is stated in the Federal version of the manual. Per the MMUTCD Guidance is a statement of recommended, but not mandatory, practice in typical situations, with deviations allowed if engineering judgment or engineering study indicates the deviation to be appropriate. All Guidance statements are labeled. The verb should is typically used.</i>	
Section 4D.15 Size, Number, and Location of Signal Faces by Approach (MI)	
<i>Support: Sections 4D.05, and 4D.16 through 4D.18 contain additional information regarding the design of signal faces.</i>	
Standard:	
<i>There shall be two nominal diameter sizes for vehicular signal lenses: 200 mm (8 in) and 300 mm (12 in). Three-hundred millimeter (12 in) signal lenses shall be used:</i>	
<i>A. For signal indications for approaches (see definition in Section 4A.02) where road users view both traffic control and lane-use control signal heads simultaneously;</i>	
<i>B. If the nearest signal face is between 35 m (120 ft) and 45 m (150 ft) beyond the stop line, unless a supplemental near-side signal face is provided;</i>	
<i>C. For signal faces located more than 45 m (150 ft) from the stop line;</i>	

D. For approaches to all signalized locations for which the minimum sight distance in Table 4D-1 cannot be met; and
E. For arrow signal indications.

A 200 mm (8 in) signal lens for a CIRCULAR RED signal indication shall not be used in combination with a 300 mm (12 in) signal lens for a CIRCULAR GREEN signal indication or a 300 mm (12 in) signal lens for a CIRCULAR YELLOW signal indication.

Option:

Different sizes of signal lenses may be used in the same signal face or signal head, except for the prohibitions listed in the Standards in this Section.

Guidance:

Three-hundred millimeter (12 in) signal lenses should be used for all signal indications for the following:

- A. Approaches with 85th-percentile approach speeds exceeding 60 km/h (40 mph);
- B. Approaches where a traffic control signal might be unexpected;
- C. All new or modernized traffic control signal locations; and
- D. Locations where there is a significant percentage of elderly drivers.

In 2004 The following projects were earmarked for the additional \$1 million added to the Local Safety Program:

- 1) STH 13609-78208A, STP-0413(326) RR4208 City of Battle Creek
Beckley Road Phase II, Intersections Riverside Dr to 6 Mile Rd
Traffic signal modernization and interconnection.
Total Project \$552,000; Federal \$200,000
- 2) STH 16609-78210A, STP-0416(016) RR4071 Cheboygan County
Mullett Burt Rd at Richardson Rd Intersection
Intersection improvements, sight distance.
Total Project \$299,590; Federal \$200,000
- 3) STH 19609-73608A, STP-0419(027) RR4194 Clinton County
State Rd at Wood Rd Intersection
Intersection improvements, traffic signal installation.
Total Project \$121,500; Federal \$96,400
- 4) STH 28609-59892A, STP-0428(020) RR4160 Grand Traverse County
Hammond Rd at 4 Mile Rd Intersection
Intersection reconstruction, widen for turn lanes, traffic signal installation.
Total Project \$267,500; Federal \$200,000
- 5) STH 38609-78234A, STP-0438(029) RR4157 Jackson County
Cooper Rd at Territorial Rd Intersection
Intersection improvements, realignment, sight distance.
Total Project \$158,500; Federal \$126,000
- 6) STH 61609-78272A, STP-0461(314) RR4112 City of Norton Shores
Harvey St at Pontaluna Rd Intersection
Intersection improvements, widen for turn lanes, traffic signal installation.
Total Project \$228,000; Federal \$181,600
- 7) STH 73609-73985A, STP-0473(021) RR4037 Saginaw County
Sheridan Rd at Washington Rd Intersection
Intersection improvements, widen for turn lanes, traffic signal installation.
Total Project \$285,000; Federal \$200,000
- 8) Two other warranted projects were identified but were not obligated using this earmark due to the locals not submitting final packages for construction in time.
 - a.) STH 22609-78215A, Dickinson County
Upper Pine Creek Rd at Boundary Line Rd Intersection
Reconstruction, VC geometrics, sight distance, intersection improvements.
 - b.) STH 39609-78236A, Kalamazoo County
S. Sprinkle Rd at Comstock Ave/Lake St Intersection
Intersection realignment, widen for turn lanes, traffic signal installation.

The Bay Region TSC's are doing accident reviews of the high crash listings for state trunk-line, including mid-block locations, and intersections. Because of threshold criteria for number of accidents, you see mainly signalized intersections on this list--- and sometimes flasher locations. MDOT regions develop safety projects (state trunk-line) for the call for projects that are driven by accident TOR (time of return) rankings.

In 2005

- ❖ MDOT has dedicated \$1 million toward signal retiming of trunk-line signals in both Muskegon and Calhoun Counties.
- ❖ MDOT has adopted Pedestrian Signal Guidelines for the uniform application of these devices. As part of the guidelines MDOT is evaluating countdown pedestrian signals at 17 locations in 2005 - 2006.

- In 2006 The Road Commission for Oakland County has been very active the implementing the following items:
- ❖ The ITE clearance interval guidelines for signal timing.
 - ❖ Adopted LED's for traffic signal displays. This change will be accomplished through new installations and modernizations.
 - ❖ Adopted the use of the box span signal layout as the preferred design choice for all intersections being constructed or modernized. This signal display is credited with improving motorist visibility, thus providing a positive contribution to the department's senior mobility initiatives. This signal layout also improves safety during signal maintenance.
 - ❖ Have started implementing the 4-color flashing Yellow Arrow left turn display in an effort to start the change from the Flashing Red left turn operation to what will become the National Standard.
 - ❖ Started using back plates on mast arm signal designs.

MDOT conducted a traffic study and has decided to proceed with the design and construction of two roundabouts at the M-81 at I-75 interchange on the northbound and southbound ramps. The main component of the project is the construction of two roundabouts at the entering and exiting northbound and southbound ramps of I-75 connecting to M-81. This interchange carries a lot of truck traffic and frequently backs up while waiting for the traffic signals. There were also crashes at the interchange that needed to be reduced and the bridge at this interchange is in poor condition and will be replaced as part of the project. The options considered to address this problem were to build a wide six-lane bridge with traffic signals, or to construct a two-lane bridge with roundabouts at each terminal. This project will provide a variety of benefits to the traveling public and the local community.

FOR IMMEDIATE RELEASE

CONTACT: Kari Arend, MDOT Office of Communications, 517-750-0406

December 7, 2006 -- The Michigan Department of Transportation (MDOT) currently is implementing several new traffic and safety devices across the state as a way to help improve traffic flow and safety for motorists. A new type of traffic signal configuration, a flashing yellow arrow left-turn signal, and traffic roundabouts are three improvements MDOT is currently making.

One device being implemented is a new type of traffic signal configuration called a "box span." This design removes traditional traffic signals from the middle of an intersection and instead places them in each of the four quadrants of an intersection. The lights are hung from wires attached to poles placed at each intersection corner. This design helps improve mobility, as well as increase safety for maintenance workers, since crews will no longer need to be stationed in the middle of a busy intersection to make repairs.

Another device currently being installed at select locations across the state is a new left-turn signal, called a "flashing yellow arrow left-turn signal." It offers a safer, more efficient way to handle traffic turning left at busy intersections. This type of signal will be used by Michigan's roadway agencies in place of the flashing red left-turn signals that now are common.

The four-arrow signals will be placed over the left-turn lane at a signalized intersection. They are being introduced

nationwide, and ultimately will be required at all intersections where there is a separate left-turn arrow signal. Implementation will take several years, with the first lights scheduled to be installed in 2006. The first flashing yellow left-turn arrow on Michigan's state highway system will be installed and activated this week on Lansing Road at Canal Road in Eaton County near the State Secondary Complex. And a final tool used to better manage traffic in high growth areas is a traffic roundabout. The number of roundabouts is increasing each year in Michigan, as more are being built at or near busy interchanges around the state. For more information on each of these innovative traffic control devices, go to the MDOT Web site at www.michigan.gov/mdot. Details are available online under "Roads and Travel" on MDOT's Web site.

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Keep Michigan families safe this winter season: Don't Crowd the Plow!



Policy Changes

MDOT has revised the Pedestrian Signal Guidelines to include criteria for countdown pedestrian signals. Countdown pedestrian signals provide peace of mind and additional information to pedestrians on how much time is remaining to cross the roadway, allowing them to adjust walking speed. Pedestrian countdown signals will be placed at signalized intersections equipped with pedestrian signals in central business districts, at established school routes and other high pedestrian volume locations. Unless there is a documented safety or operational concern that can be addressed by this device, pedestrian countdown signals will not be added to an existing signalized location until it is being modernized.

MDOT has developed left-turn phasing guidelines to provide a better understanding when to consider left-turn phasing and what type to implement. These guidelines will serve as the basis for roadway agencies to adopt the flashing yellow arrow in lieu of the flashing red ball as part of left turn phasing. Several county and cities agencies along with MDOT have received approval to use the left-turn flashing arrow. This change in left-turn phasing offers a safer, more efficient way to handle traffic turning left at busy intersections. The signals are being introduced nationwide and ultimately will be required at all intersections where there is a separate left-turn arrow. The implementation process will take several years, with the first lights installed in Livingston County in 2005.

October 20, 2005

TO: Brian Murphy, Assistant City Manager / Services
FROM: John Abraham, Deputy City Engineer/Traffic Engineer
CC: Steve Vandette, City Engineer
RE: Evaluation of the Updates made to Traffic Signal Clearance Interval Timings.

The Traffic Engineering division is continually reviewing research and practices from all around the country in the interest of making travel safer and more efficient in the City of Troy. In 2001 we performed a state-of-the-art review on traffic signal timing practices and their effects on traffic crashes. One area of traffic signal timings that has proved to increase safety was the proper design of the clearance intervals. Clearance interval is the phase of a traffic signal most popularly known as the "amber phase" or the "yellow" interval when the signal changes from green to red. The clearance interval actually includes a certain number of seconds when the light is yellow, also called the yellow interval and also a brief "all-red" interval when all directions of traffic will see a red light. Traditionally in Michigan, the Department of Transportation and most other road agencies used a standard amount of time for the yellow interval and a very brief all-red interval (0.1 second to 1 second). Our research of practices around the country showed that designing these two intervals based on site-specific data such as the width of the intersection leg and approach speed yields substantial safety benefits. Specifically, research suggests that a well-designed clearance interval will reduce intersection crashes, reduce red light running, and in general make intersections safer. Based on these and the guidelines published by the Institute of Transportation Engineers, we then calculated the clearance intervals for every traffic signal in the City of Troy. A major difference with the new timings was that the all-red interval was much higher now (1 second to 2.5 seconds). This allows safe passage of vehicles through the intersection, even if they enter the intersection at the tail end of the yellow interval.

The revised timings were forwarded to the Road Commission for Oakland County (RCOC) for implementation in 2001. RCOC partnered with the City to implement the calculated clearance interval and installed the revised timings during mid 2003 to late 2004. As an evaluation of the change, a traffic crash analysis was performed for the top 20 high crash intersections in the City. Intersection crashes that occurred one year before the change was made and one year after were compared as an evaluation. Intersection crash is defined as a crash that occurs within a 200 foot radius from the center of the intersection. Intersections that may have been influenced directly by any other factors such as road construction, new buildings in the vicinity, water main projects in the right of way, were eliminated from the list of intersections being studied to give a true "apple to apple" comparison of traffic crashes before and after the revised timings were installed.

The evaluation of the top 20 crash locations in the City show that we have realized up to a 63% reduction in traffic crashes and an overall average of around 20% reduction in total crashes at these intersections. The average reduction in right angle type (broad side) crashes was around 20%, and these tend to be the injury-causing severe crashes at intersections.

The following table gives the details of the one year before and one year after comparison of traffic crashes at these locations.

Intersection	Change Date	TOTAL CRASHES			BROAD-SIDE CRASHES		
		Prior Year	After Year	% Chg	Prior Year	After Year	% Chg
Big Beaver & Rochester	4/24/2003	64	75	17.18%	8	12	50%
Big Beaver & Crooks	4/24/2003	68	73	7.35%	15	9	-40%
Big Beaver & John R.	8/4/2003	51	45	-11.76%	12	10	-17%
Maple & Coolidge	5/19/2003	41	35	-14.63%	8	6	-25%
Big Beaver & Adams	2/19/2004	27	15	-44.44%	4	0	-100%
Big Beaver & Coolidge	8/4/2003	31	27	-12.90%	5	6	20%
Maple & John R	5/19/2003	60	52	-13.33%	11	15	36%
Long Lake & Rochester Rd.	6/18/2004	34	17	-50.00%	9	7	-23%
Big Beaver & Livernois	5/19/2003	30	20	-33.33%	4	3	-25%
Maple & Rochester Rd.	1/16/2004	23	21	-8.69%	10	4	-60%
14 Mile Rd. & Stephenson	2/4/2004	20	11	-45.00%	1	2	100%
Big Beaver & Dequindre	1/30/2004	31	17	-45.16%	2	6	200%
Square Lake & Rochester Rd.	5/19/2003	32	24	-29.40%	9	2	-66%
Maple & Crooks	5/19/2003	32	34	3.12%	6	3	-50%
14 Mile Rd. & Dequindre	2/4/2004	8	13	62.50%	4	2	-50%
Wattles & John R	8/5/2003	29	13	-44.80%	4	5	25%
Maple Rd. Livernois	5/2/2003	26	27	3.84%	8	8	0%
Square Lake & Livernois	12/8/2003	24	17	-29.16%	4	1	-75%
Wattles & Crooks	1/30/2004	26	13	-50.00%	3	1	-66%
Big Beaver & I-75	3/24/2004	54	34	-62.96%	0	0	0%
Total		711	583	-18%	127	102	-20%

These are substantial reductions considering the costs involved with traffic crashes. The National Safety Council estimates that the cost of motor vehicle crashes as:

Average Economic Cost per Death, Injury, or Crash, 2003

Death \$1,120,000

Nonfatal Disabling Injury \$45,500

Property Damage Crash (including non-disabling injuries) \$8,200

The calculable costs of motor vehicle crashes are wage and productivity losses, medical expenses, administrative expenses, motor vehicle damage, and uninsured employer costs. Using these estimates, if we were to conservatively estimate the benefit of the traffic crashes reduced at our top 20 intersections, it comes to around \$2 million. There was a reduction of 128 traffic crashes at the top 20 intersections and a reduction of 25 broadside crashes that normally result in injuries in the one year after the signal timing changes were made. If similar reductions were realized at all our 145 or so signalized intersections, this benefit may add up to many million dollars.

In the meantime, the City also had a representative in the "Michigan Traffic Signal Summit" along with representatives from MDOT, Road Commissions for several counties, other cities, consultants and utility companies, in an effort to enhance traffic signal operations in the county and in the state as a whole. One of the major projects that came out of the Summit is the ongoing retiming of traffic signals in Oakland County (non-SCATS) that have not been updated for almost 10-15 years. One of the subcommittees that we

participated in looked at clearance intervals and worked closely with Wayne State University. Largely due to the efforts of this committee, MDOT changed their decades old policy on clearance interval design. The new policy came into effect in mid-2002 and reflects closely the timings that were submitted to RCOC by us in 2001. JKA

OHSP continues to fund the MPO traffic safety study. Safe and efficient highway transportation systems are a key element in the economic prosperity of a region. The majority of transportation planning activities in urban, suburban and partially rural areas are coordinated MPO's, which consist of various local transportation agencies including cities, townships, county road commissions, public transit agencies, and MDOT. One of the roles of an MPO is to identify and prioritize the traffic operational and safety needs, and to invest available resources in projects and programs, which maximizes societal benefits. However, many times they face challenges in meeting such goals due to limited staff and resources in performing preliminary planning and analyses. WSU performs site-specific traffic crash analysis and safety audits to identify and prioritize intersections within the boundaries of the MPO. This entails all aspects of a traffic and safety engineering study including identification of 'high' crash locations, data collection and analysis, and development of mitigation strategies. In addition, WSU will prepare implementation plans and evaluation plans for the improvement projects recommended as a part of this activity. Bay County was completed in 2004. The Battle Creek, Grand Valley Metro and Southwestern Michigan Regions were completed in 2005 along with a detailed US-2 Road Safety Audit. The 2006 projects for the Flint/Genesee and Saginaw Regions have recently been completed. In 2007, traffic and safety engineering studies for the Kalamazoo and West Michigan Shoreline Regions will be completed.

MDOT has supported and conducted MPO safety forums for the past 3 years. There have been two types of these forums: The first forum presented high-level information on a variety of safety topics that included both physical and behavioral presentations and the second forum focused on specific safety issue faced by that community, such as a higher than average incidence of alcohol-related crashes, or elderly driver issues or intersection crash issues. The forums included a variety of participants from several disciplines, i.e., emergency management, schools, insurance agencies, road commissions, cities, transit providers, non-motorized advocates, engineers, etc. Approximately 35-50 people attended each forum.

Wayne State University began working with several MPOs as a directly result of these forums. Local decision-makers identified a number of problem intersections. The university studied the intersections and provided mitigation and other factors to help increase the safety of these intersections. The findings were presented to the citizens at a public meeting. The next step is determining how to proceed in implementing these suggestions.

Rural safety forums have been held in all regions of the state. A marketing plan was developed for the regional planning organizations to help them schedule the forum, ensure adequate participation, and provide information on topics of interest for their area. Attendance varied any where from 10 to 60 people. MDOT is currently working with FHWA to determine what the next step in the rural areas will be so as to provide beneficial information.

ROUNDAABOUTS:

- ❖ A new roundabout was constructed at Bennett and Hulett Roads in Meridian Township (concept design by DLZ). The project was built with safety funds and will be significantly safer than the previous intersection where there were serious injuries from left turn head on crashes.
- ❖ There continues to be a major roundabout initiative in Oakland County where there are multiple roundabouts either planned or under construction at some of the busiest, well traveled intersections.
- ❖ DLZ has conducted 3 Roundabout educational classes for MDOT regions with a 4th scheduled in the coming months
- ❖ A new double roundabout at the interchange of M-81 and I-75 near Saginaw has been designed and is under construction and to be completed in 2006. This intersection type was selected because of safety benefits and cost savings relative to an interchange with traffic signals.
- ❖ MDOT is soliciting proposals for another roundabout design on M-19 in Macomb County (Richmond)

AAA Road Improvement Demonstration Program:

- ❖ First four pilot projects completed in Detroit in 1997
- ❖ Completed projects in 1998 with MDOT, Wayne County and Grand Rapids
- ❖ 2002 evaluation begins of the first 84 completed intersections
- ❖ 2004 expansion of the program continues
- ❖ Work continues in Detroit and Grand Rapids
- ❖ Introduction in Wisconsin
- ❖ 2006 release of the RIDP toolkit

Results:

- ❖ *435 intersections studied*
- ❖ *Improvements implemented at 336 intersections*
- ❖ *Funding applications, design and construction continues for the improvements at the remaining 99 locations*
- ❖ *Review of the first 84 completed intersections*
- ❖ *25% reduction in crashes*
- ❖ *40% reduction in injuries*
- ❖ *Higher reduction in crashes and injuries for drivers 65 years and older*
- ❖ *Projected 15-year societal savings - \$100Million*
- ❖ *Additional Michigan cities have undertaken similar programs: Port Huron and Bay City*
- ❖ *Program to AAA Wisconsin in Milwaukee (2004) and Madison (2005)*

RED-LIGHT RUNNING

Issues Addressed:

1. In Michigan, red light runners are involved in only 15 percent of signalized intersection crashes, but account for 35 percent of the severe injuries and deaths in these crashes.
2. The use of camera technology as a red light enforcement tool is a controversial topic that is often debated more on emotion than fact.
3. A track record of red light camera programs has been developed in the United States that can be used to sort out good and bad consequences of these programs, and can guide future legislation. Proposed Michigan camera legislation (current and past) does not always incorporate wording that would avoid pitfalls that other programs have experienced.
4. Engineering countermeasures to red light running are frequently overlooked or under-researched.

Strategies:

1. Measure and identify the frequency of red light running in Michigan.
2. Educate motorists on red light running issues: severity of crashes, how to react to yellow signal.
3. Identify and implement promising engineering countermeasures to combat red light running.
 - Reference ITE Publication, "Making Intersections Safer: A Toolbox of Engineering Countermeasures for Red Light Running".
4. Provide information to enforcement agencies on the availability, cost and effectiveness of traffic signal accessory lights that help police identify a signal indication from downstream direction.
5. Develop selective enforcement programs to focus on intersections where crashes have occurred due to red light running. The goal of this program should be to change driver behavior using visible enforcement patrols, citations and publicity announcing the selective enforcement program and the targeted intersections.
6. Assemble information that will be useful to the Michigan Legislature and others regarding red light camera programs:
 - attitude of Michigan motorists toward red light running and red light camera enforcement
 - balanced information of the benefits and pitfalls of red light camera programs, as noted in other areas throughout the United States
 - Examples of model legislation from other states
 - Positions, if known, of state and national transportation-related organizations.

Near-term Action Plans:

#	Near-Term Action	Contact	Agency
1	Generate and distribute annual list of red light running crashes by geographic area showing frequency and severity of crashes	Dave Morena	FHWA
2007 ACCOMPLISHMENTS			
<i>No Update to report at this time</i>			

2	FHWA to develop and maintain a presentation that discusses the pros and cons of red light camera programs, with examples of good and bad programs across the country. This information will be offered to the legislature and other groups that take up the issue of camera enforcement.	Dave Morena	FHWA
2007 ACCOMPLISHMENTS			
<i>No Update to report at this time</i>			

3	<p>The following near term actions from other parts of this plan will have a direct bearing on red light running crashes:</p> <ul style="list-style-type: none"> • Engineering clearance ITE Interval • Engineering-far side signal location • Enforcement-rat box • Enforcement at specific locations 	ISAP	GTSAC
2007 ACCOMPLISHMENTS			
No Update to report at this time			

Resources:

Stop Red Light Running Home page: stopredlightrunning.com

2001-2006 ACOMPLISHMENTS
<p><i>OHSP hosted a 3-hour meeting, in which Barney Leslie, from Northrop Grumman and Marc Start from URS Corporation talked about the respective activity in relation to red light running and intersection safety.</i></p>
<p><i>OHSP has sponsored Intersection Enforcement activities in FY05, FY06 and FY07</i></p>
<p>D.C. Red-Light Cameras Fail to Reduce Accidents Del Quentin Wilber and Derek Willis washingtonpost.com October 4, 2005</p> <p><i>The District's red-light cameras have generated more than 500,000 violations and \$32 million in fines over the past six years. City officials credit them with making busy roads safer. But a Washington Post analysis of crash statistics shows that the number of accidents has gone up at intersections with the cameras. The increase is the same or worse than at traffic signals without the devices.</i></p> <p><i>Three outside traffic specialists independently reviewed the data and said they were surprised by the results. Their conclusion: The cameras do not appear to be making any difference in preventing injuries or collisions. "The data are very clear," said Dick Raub, a traffic consultant and a former senior researcher at Northwestern University's Center for Public Safety. "They are not performing any better than intersections without cameras."</i></p> <p><i>The District started the camera program in 1999, and from the beginning, officials said they were aiming to curtail red-light running and accidents. At the time, Terrance W. Gainer, then the second-highest ranking D.C. police official, said the cameras would "get people to stop at red lights and avoid crashes. . . . Hopefully, we'll have a few less messes to clean up."</i></p> <p><i>D.C. Police Chief Charles H. Ramsey said he remains convinced that the devices are worthwhile. Even if the number of crashes is not going down, he said, citations for red-light running have dropped by about 60 percent at intersections that have cameras. Ramsey said the number of accidents would be even higher without the cameras, adding that he would like to install them at every traffic light in the city. He pointed to last year's steep decrease in traffic fatalities -- 45 people died compared with 69 in 2003 -- as evidence that the program is working. "I'd rather have them than not have them," Ramsey said. "They make people slow down. They reduce the number of traffic violations, and that's a good thing."</i></p> <p><i>City officials attribute the increase in accidents to higher traffic volume. But that does not explain why the presence of cameras has failed to slow the rate of accidents at those intersections, Raub and others said. The outside experts suggested that the cameras might be more useful at other locations, and D.C. officials said they are studying the issue. The city has cameras at 45 intersections. They take photographs of cars running red lights, generating tickets that are processed by a private contractor. Police oversee the issuance of tickets, which carry \$75 fines, and the money goes into the city's general fund -- nearly \$5 million last year.</i></p> <p><i>The Post obtained a D.C. database generated from accident reports filed by police. The data covered the entire city, including the 37 intersections where cameras were installed in 1999 and 2000. The analysis shows that the number of crashes at locations with cameras more than doubled, from 365 collisions in 1998 to 755 last year. Injury and fatal crashes climbed 81 percent, from 144 such wrecks to 262. Broadside crashes, also known as right-angle or T-bone collisions, rose 30 percent, from 81 to 106 during that time frame. Traffic specialists say broadside collisions are especially dangerous because the sides are the most vulnerable areas of cars.</i></p> <p><i>The number of crashes and injury collisions at intersections with cameras rose steadily through 2001, then dipped through 2003 before spiking again last year. The results were similar or worse than figures at intersections that have traffic signals but no cameras. The number of overall crashes at those 1,520 locations increased 64 percent; injury and fatal crashes rose 54 percent; and broadside collisions rose 17 percent. Overall, total crashes in the city rose 61 percent, from 11,333 in 1998 to 18,250 last year.</i></p> <p><i>Lon Anderson, a spokesman for AAA Mid-Atlantic, said the data reinforce the motor club's view that the red-light effort is targeted more at generating revenue than at reducing crashes. "They are making a heck of a lot of money, and they are picking the motorists' pockets on the pretense of safety," he said. Red-light cameras are used in 12 states, including Maryland, where they are deployed in Montgomery and Prince George's counties. In Virginia, the General Assembly</i></p>

eliminated red-light cameras this year partly because of concerns raised by some legislators about civil liberties. The action affected six Northern Virginia jurisdictions: Alexandria, Arlington County, Fairfax City, Fairfax County, Falls Church and Vienna.

The District installed its first batch of 26 cameras in 1999. City officials added 14 the next year. Some intersections have more than one camera to cover different approaches. All told, the cameras installed in 1999 and 2000 covered 38 intersections; a camera subsequently was removed from one of them. Ramsey said city officials put the cameras where police noticed the most red-light running. At the start of the program, police officials said they also received advice on camera placement from residents and from the private contractor that operated the devices.

Nine more cameras were installed in July, boosting the number of monitored intersections to 45. Most of those drivers ticketed come from outside the city. In August, for example, less than one-fourth of the citations were issued to motorists from the District. D.C. police also operate photo-radar devices that take pictures of speeding motorists. Because many of these cameras are mobile and used at varying times, they were not included in The Post's review.

Douglas Noble, the chief traffic engineer for the D.C. Department of Transportation, said his office was examining crash data and plans to review the red-light camera locations. The department collects the data from police reports and advises police about where to install the devices. Noble said that no studies have been conducted on the District's red-light cameras in several years but that he "would not disagree" with The Post's analysis. "I don't necessarily have an explanation" for the trends, he said.

He added that he believes the severity of injury crashes has decreased at camera locations. The city crash database does not categorize the severity of crashes. AAA and other critics have accused the city of installing cameras in high-volume locations where they could generate thousands of tickets, regardless of how many accidents happened there. The analysis raised questions about where police installed the cameras. Nine intersections with cameras had two or fewer crashes annually in 1998 and 1999; seven reported no crashes that led to injuries or fatalities during that period. Officials installed cameras at six of the 20 most crash-prone intersections in 1998, data show.

Seventeen of the 45 intersections now covered by red-light cameras were ranked among the 50 most accident-prone locations in the District last year. Individual results at intersections vary, the analysis shows. The camera at New York Avenue and Fourth Street NW, for example -- on one of Washington's busiest commuter routes -- has generated the most tickets in the city: more than 150,000 since 1999. Although the number of monthly citations there has dropped 65 percent, crashes nearly doubled, from 12 in 1998 to 23 last year.

The number of crashes has decreased in recent years at another busy spot, Bladensburg Road and New York Avenue NE, where cameras have generated more than 73,000 tickets. The intersection had 35 crashes in 1998, 88 in 2001 and 71 last year. The camera at Wisconsin Avenue and Brandywine Street NW has produced nearly 30,000 tickets, but its crash totals have hovered around two a year.

Advocates for the cameras point to research such as a recent national study by the Federal Highway Administration that showed the number of broadside crashes dipped 25 percent at sites with cameras. The study found that rear-end crashes rose 15 percent at camera locations. But because broadside crashes are more dangerous and cause greater damage, the study concluded that the cameras can help reduce the costs of traffic accidents.

Gang-Len Chang, a professor of civil engineering at the University of Maryland, said cameras can be useful in reducing serious crashes if deployed properly. Chang and the other traffic specialists said the city should not abandon red-light cameras. Rather, they said, the mixed results indicate that D.C. officials should conduct a thorough review of camera sites. "They definitely should look at the locations and find where the cameras would be much more effective," said Nicholas J. Garber, a professor of civil engineering at the University of Virginia who studied the use of red-light cameras in Fairfax County.

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ENFORCEMENT

Issues Addressed:

1. The effect of enforcement strategies on intersection safety has not been as carefully documented or widely discussed.
2. There may be opportunities to more fully-integrate enforcement strategies into intersection safety initiatives.

Strategies:

1. Analyze current enforcement methods in relation to intersection safety to determine possible improvements.
2. Include enforcement in the discussions when analyzing engineering and educational countermeasures.

Near-term Action Plan:

#	Near-Term Action	Contact	Agency
1	Individual enforcement agencies should consider selective enforcement at targeted high crash intersections. This serves to advise the driving public about proper driving behavior via the threat of enforcement action. Elements of this program would include: <ul style="list-style-type: none"> • Identify high-crash locations • Use of 'Rat box' to help identify red light runners (optional) • Publicity of the program to expand the driving public's awareness of the locations and the institutional effort to improve driving behavior. 	Steve Schreier	OHSP
2007 ACCOMPLISHMENTS			
<p><i>For 2007, Intersection enforcement has been expanded to be included with each task force agencies strategic plan (not just the 6 pilot agencies). To date we have over 30 agencies that will be conducting intersection enforcement activities in 2007.</i></p> <p><i>In addition July 22-28 has been designated "Red-Light Running enforcement week" in which we will have all agencies conducting intersection enforcement during this week.</i></p>			

Resources:

Michigan State Police: michigan.gov/msp

International Association of Chiefs of Police: www.theiacp.org/

Michigan Association of Chiefs of Police: michiganpolicechiefs.org/page.cfm/1/

2001-2006 ACOMPLISHMENTS
<p><i>OHSP is sponsoring Intersection Enforcement activities with 6 local police agencies in 2005. Individual enforcement agencies will be identified to provide selective enforcement at targeted intersections within their jurisdiction as a means of reminding motorists which intersections are experiencing the most crashes and as a way to remind motorists to drive with proper driving behavior. Engineering assistance will be used to identify high-crash locations. A publicity program to expand the driving public's awareness of the locations and the institutional effort to improve driving behavior will also be used.</i></p> <p><i>A viable and relatively inexpensive solution to officer and motorists safety is to mount a so-called "rat box" on the back side of traffic signals. These rat boxes contain light emitting diodes that activate when the signal turns red. This type of system allows an officer stationed downstream from the signal to more safely observe and cite offenders accordingly. Troy MI Pd and Santa Clara CA Pd have used these devices and have been pleased with the added safety it provides to their officers and other motorists.</i></p> <p>2005</p> <ul style="list-style-type: none"> ❖ Six law enforcement agencies conducted 195 intersection enforcement patrols which resulted in: ❖ 3,207 vehicle stops ❖ 74 speeding citations ❖ 1,057 red-light running citations ❖ 1,117 safety belt violations ❖ 93 misdemeanor and 18 felony arrests

2006

- ❖ Six law enforcement agencies conducted 132 intersection enforcement patrols which resulted in:
- ❖ 2,209 vehicle stops
- ❖ 151 speeding citations
- ❖ 259 red light running citations
- ❖ 719 safety belt violations
- ❖ 110 misdemeanor and 10 felony arrests

For 2007, Intersection enforcement has been expanded to be included with each task force agencies strategic plan (not just the 6 pilot agencies). To date we have over 20 agencies that will be conducting intersection enforcement activities in 2007.

In addition July 22-28 has been designated "Red-Light Running enforcement week" in which we will have all agencies conducting intersection enforcement during this week.

Issues Addressed:

1. Intersection safety needs to be recognized and acknowledged as a public problem. For example, airplane safety is seen as a much more serious concern for the public although the number of crashes, fatalities, and injuries is much, much lower than both traffic and intersection crashes. (There were no commercial airline crashes in the United States in 2002.)
2. Public education should improve driver performance and reduce the likelihood of crashes in areas exposed to new intersection designs, new operational strategies, or proposed new enforcement techniques.

Strategies:

1. Use communications specialists to:
 - Conduct market research
 - Communicate intersection crash facts (e.g., demonstrate and illustrate the gravity of consequences for violating the law at intersections...the amber light law).
 - Michigan Technological University will continue providing a "Intersection Safety for Non Engineers" class
 - Provide the Departments of Education and State intersection safety information provided in the driver education curriculum and the related training materials, and in other publications such as the *What Every Driver Must Know*
 - Solicit the input and support of our partners including higher-education institutions (MSU, WSU, UMTRI, Michigan Tech)
2. Develop and hold a Multi-state Intersection Safety Conference
 - The GTSAC should host a multi-state Midwest Intersection Safety Conference. A similar conference was held in Baltimore in June 2003 and discussed intersection safety initiatives and best practices. Engineers, law enforcement, and safety professionals from the Midwest would be brought together to share information on the state of the practice on intersection safety.
3. Develop a statewide media Intersection Safety campaign:
 - Includes a media strategy
 - Increases public awareness through editorials, radio, public service announcements, etc.
 - Uses media to explain how to use new highway improvements or operational treatments
 - Uses media to provide safety arguments for enforcement activity
 - Uses information on best practices/approaches from states and locals to enhance media campaign materials.

Near-term Action Plan:

#	Near-Term Action	Contact	Agency
1	Publicize the ISAP at forums, meetings and seminars	Steve Schreier	OHSP
2007 ACCOMPLISHMENTS			
❖ The ISAP is sent to traffic safety partners for updates and review a minimum of 2 times per year. ❖ An update of the ISAP is provided to the GTSAC 2 times per year. ❖ The ISAP along with other intersection related information is posted to the Yahoo website created 3 years ago: http://finance.groups.yahoo.com/group/IntersectionSafety/			
Based on a request from the Washtenaw County Road Commission (WCRC), The MDOS "What Every Driver Must Know" handbook is being updated to include new information regarding Roundabouts. This activity should be completed by this summer and is in cooperation with MDOS, OHSP, MDOT and WCRC.			

Resources:

Advocates for Highway and Auto Safety: saferoads.org/issues/fs-intersection.htm

FHWA Intersections: <http://safety.fhwa.dot.gov/intersections/index.htm>

Michigan Yahoo Intersection Safety Website: <http://safety.fhwa.dot.gov/intersections/index.htm>

2001-2006 ACOMPLISHMENTS

DLZ Inc., has been active in conducting educational seminars for key MDOT staff regarding roundabouts. Briefly, each region of MDOT has what they call "project development teams" which are key decision-makers who are involved in identifying, programming, and implementing road projects. To date, two of the seven regions have had DLZ come in and give a 2-3 hour educational seminar regarding the pros and cons of a roundabout intersection and possible applications. DLZ is also going to be doing the same presentation for at least two more regions within the next 2-4 months. MDOT is enthusiastic about this safety treatment, and is considering installation at several locations.

Conducted an Intersection Safety 'Panel' discussion at the 2005 Michigan Association of Chiefs of Police annual conference in Grand Rapids, MI, February 4th, 2005.

MDOT has conducted and continues to conduct Access Management Classes at various locations and dates through out the state.

ACRONYMS

AAA	American Automobile Association
AASHTO	American Association of State Highway and Transportation Officials
CMAQ	Congestion Mitigation and Air Quality
CPR	Crash Process Redesign
EMS	Emergency Management System
FHWA	Federal Highway Administration
GIS	Geographic Information System
GPS	Global Positioning System
GTSAC	Governor's Traffic Safety Advisory Commission
ISAP	Intersection Safety Action Plan
ISC	Intersection Safety Committee
ITE	Institute of Transportation Engineers
LEAMS	Law Enforcement Agency Management System
LTAP	Local Technical Assistance Program
MDE	Michigan Department of Education
MDOS	Michigan Department of State
MDOT	Michigan Department of Transportation
MPO	Metropolitan Planning Organization
MSU	Michigan State University
NCHRP	National Cooperative Highway Research Program
NHI	National Highway Institute
OHSP	Office of Highway Safety Planning
PSA	Public Service Announcement
STP	State Transportation Plan
TOPICS	Traffic Operations Program to Increase Capacity and Safety
TSC	Transportation Service Center
WSU	Wayne State University

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*Active Member